

**Response to EPA Comments on Round 3 Groundwater Pathway Assessment:
Field Sampling Plan for Stratigraphic Coring and Bulk Sediment – Gunderson
(EPA letter dated September 20, 2007)**

EPA Comment	LWG Comment Category	LWG Response
General Comments:		
EPA does not agree with the proposal to install stratigraphic cores along one transect extending from the groundwater contaminant plume. EPA believes that a total of 3 transects are necessary to get more lateral coverage. Without an understanding of the flow path from the site, the selection of boring locations along X-X' is too narrow to ensure adequate spatial coverage. Figure 4-1 depicts additional borings offset from the transect. This represents a better approach to assure that we do follow the formation if it is in the area. In general, EPA recommends increased sampling density in the near shore area closer to the facility with lower coverage further downstream; EPA does not believe that it is necessary to install borings all the way to the Portland Shipyard on the other side of the river.	3	The LWG agrees to modify the stratigraphic core locations to provide greater lateral coverage. The LWG's proposed revised core locations, which are largely consistent with EPA's proposal, are described in the attached counter-proposal for the Round 3 Gunderson TZW Field Sampling Approach.
EPA does not agree with the proposed approach with attempts to evaluate whether a complete contaminant transport pathways exists based on stratigraphic information and surface sediment grab samples alone. EPA believes that groundwater and/or transition zone water data are needed to evaluate the deep groundwater contaminant migration pathway at the Gunderson site. Estimating water concentrations based on bulk sediment concentrations and partition factors may not be an accurate approach for chlorinated solvents and their breakdown products due to uncertainties in partition factors and sampling handling procedures. EPA recommends collecting groundwater (i.e., deep transition water) samples.	1, 2	Although the LWG maintains that its original proposal to analyze surface sediment grab samples would be sufficient to determine whether a complete transport pathway exists for the upland plume to reach the transition zone, we agree to collect up to 8 transition zone water samples from depths of 30-90 cm below mudline in locations where stratigraphic coring data indicates that the conductive zone may project into the river. Details are described in the attached counter-proposal. No deep (>3 ft) groundwater/TZW samples will be collected, as this information is not needed to determine the presence or absence of a complete groundwater plume transport pathway to the biologically active zone of the sediments or to surface water. No shallow bulk sediment sampling will be performed as originally proposed in the draft FSP.
EPA believes that a combined coring program and groundwater sampling program can determine whether a complete contaminant migration pathway exists in one field effort. Even if the results are inconclusive, sufficient data will be available for a focused follow-	2	Implementation of the LWG's counter-proposal will yield the information needed to determine whether a complete migration pathway exists through a phased program of stratigraphic coring followed by TZW sampling, if required. The proposed approach includes a meeting with EPA to finalize

LWG COMMENT CATEGORIES

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| 1 – Strongly Disagree; cannot accept | 4 – Further internal discussion is needed |
| 2 – Disagree but can accept | 5 – unclear; requires clarification from EPA |
| 3 – Agree | |

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up phase. Previously, other parties (Siltronic & Arkema) have utilized quick turn-around lab efforts to inform the field program & allow for scope modifications to address contaminant distribution, fate & transport questions.		sample locations and other details of the TZW sampling based on the results of the stratigraphic coring.
Specific Comments:		
Section 3.0 – Sampling Objectives: EPA does not agree with the statement: “Understanding the projection of this zone beyond the immediate area offshore of the Gunderson Area 1 (i.e., upstream and downstream) is not an objective of this investigation or of the RI.” EPA believes that the sample collection program should be sufficiently broad to characterize groundwater contaminants in the deep sand and gravel zone offshore of the Gunderson facility in the vicinity of the known upland chlorinated solvent groundwater plume. In addition, an estimate of chemical flux to the Willamette River should be included as a sampling objective.	2	The LWG believes that the expanded lateral coverage of the proposed stratigraphic cores (and TZW sampling, if required) will address this concern. If a complete migration pathway is identified, the data from this program will provide sufficient information to support order-of-magnitude estimates of chemical flux to the water column.
Section 4.0 – Sampling Approach: To meet the data collection objectives of the Gunderson Groundwater FSP, EPA recommends modifying the sampling approach as follows: <ul style="list-style-type: none"> • An additional cross section (Z-Z') that bisects the angle between X-X' and the downstream shoreline should be projected offshore. The angle between X-X' & Y-Y' increased for additional spatial coverage; • Three arcs centered on X-X' should be drawn to connect points on X-X', Y-Y', and Z-Z' located approximately 750 feet, 1250 and 1750 feet offshore of Gunderson; • Stratigraphic cores should be installed at each of the six points on X-X', Y-Y', & Z-Z'; • Stratigraphic cores should be examined and 2- 3 intervals from each location selected for the collection of bulk sediment samples with follow-up collection of TZW 	1, 3	<p>The LWG generally concurs with EPA’s proposed modifications to the transect locations and individual stratigraphic core locations, with minor exceptions. Please see response to the first general comment 1 (above) and the attached counter-proposal.</p> <p>The LWG disagrees with EPA’s proposal to collect and analyze bulk sediment and TZW/groundwater samples at depth. The LWG’s proposed counter-proposal, which provides for collection and analysis of surface (30-90 cm below mudline) TZW samples in locations where the conductive flow zone may project into the channel, will address the objective of evaluating the presence or absence of a complete groundwater plume transport pathway to the biologically active zone of the sediments or to surface water. Analysis of subsurface samples is not needed to address this central question of the investigation.</p>

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<p>samples using GeoProbe or similar techniques that allow for the collection of groundwater grab samples.</p> <p>EPA believes that this approach will determine 1) whether & at what depths the sand/gravel occurs offshore, and 2) provide data to assess the concentrations of VOCs, if any, in TZW, bulk sediment.</p>		
<p>Section 4.1 – Stratigraphic Coring: The last paragraph of this section should state a decision regarding the bulk sediment and TZW sampling intervals to be selected for chemical analysis will take place following consultation with EPA.</p>	3	<p>As described in the attached counter-proposal, the LWG proposes to meet with EPA during the week of November 5 to determine TZW sampling locations based on the results of the stratigraphic coring.</p>
<p>Section 4.2 – Surface Sediment Sampling: While the coring program does not preclude the collection of surface grab samples, the stratigraphic core program should ensure that the relevant stratigraphic units are identified and collected for chemical analysis.</p>	1	<p>The LWG disagrees that sediment samples need to be analyzed to meet the objectives of this program. No shallow bulk sediment sampling will be performed as originally proposed in the draft FSP. The TZW sampling is a more direct measure and replaces the need for bulk sediment grabs.</p>
<p>Section 4.3 – Chemicals of Interest: Bulk sediment and TZW samples should be analyzed for all volatile organic compounds (VOCs) to allow the assessment of contaminant degradation.</p>	3	<p>The LWG agrees to analyze TZW samples for the full VOC list specified in QAPP Addendum 3</p>
<p>Section 7.0 – Standard Operating Procedures: Standard Operating Procedures (SOPs) should be developed for the collection of TZW grab samples using the GeoProbe device or similar collection device. Sample labeling procedures should allow for the designation of TZW grab samples.</p>	3	<p>The LWG agrees to revise the FSP to include SOPs for TZW collection using the Trident Probe and for TZW sample labeling.</p>

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